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**Calendar of Events****JANUARY 2007**

12  
USSC Meeting  
CONSONUS, West Jordan  
R.S.V.P Only

**FEBRUARY 2007**

22  
City & County Directors Conf.  
Salt Lake City, Utah

**MAY 2007**

8  
Western States Geologists Conf.  
St. George, Utah

10  
USSC joint meeting w/Nevada  
St. George, Utah

31  
City & County Directors Conf.  
Salt Lake City, Utah

**AUGUST 2007**

20-24 (Tentative Dates)  
Public Officials Conference  
Park City, Utah

**UTAH "SHAKES" IN AUGUST**

BY GARY E. CHRISTENSON

Utah hosted two unique urban seismic surveys in August this year. Both surveys were designed to give us a better understanding of geologic conditions deep in Wasatch Front basins that can amplify earthquake ground motions. The University of Texas at Austin (UTA) brought a specially designed shaker truck to measure conditions down to 1000 feet, and the U.S. Geological Survey (USGS) performed deeper surveys to discern conditions down nearly a mile.

These projects were performed in cooperation with Utah's Ground Shaking Working Group, which is coordinating collection of data to develop a "community velocity model" (CVM) for the Wasatch Front. The CVM will characterize shear-wave velocity of basin-fill materials and depth to bedrock in the deep sediment-filled Wasatch Front basins beneath Ogden, Provo, and Salt Lake City. The CVM will use these data in a three-dimensional computer model to estimate how sites will respond when a large earthquake occurs. Presently, we lack shear-wave-velocity data from the 100- to 1000-foot depth interval, as well as data on the dip of the Wasatch fault and depth to bedrock. These new surveys will help fill these gaps.

One of the Network for Earthquake Engineering Simulation (NEES) sites funded by the National Science Foundation is at UTA, which has developed several large-scale mobile "shaker" trucks specifically designed for dynamic field testing. One of these shakers, informally known as the "Liquidator," is designed to generate long-period (low-frequency) seismic waves that allow penetration deeper than other methods for direct shear-wave-velocity measurements. Under a UTA project funded by the USGS National Earthquake Hazards Reduction Program, which was also subsidized by NEES for equipment mobilization, the "Liquidator" came to Utah to perform about 10 deep soundings around Salt Lake Valley to determine shear-wave velocity of sediments to depths of 1000 feet. Ken Stokoe is director of the NEES program at UTA; Bradley Wilder, a graduate student at UTA, headed the Utah operation; and Jim Bay, Utah State University and UTA associate, provided technical oversight. The Utah Geological Survey and Utah Department of Transportation (UDOT) assisted in identifying sites; several local property owners graciously gave permission to perform surveys on their property.



## UTAH “SHAKES” IN AUGUST CONTINUED

In addition, the USGS has been performing various seismic surveys using a smaller vibratory “shaker” truck in Utah since 2003 to contribute to developing Utah’s CVM for the Wasatch Front. This year, the USGS performed several long, deep primary-wave (P wave) seismic-reflection surveys in Utah Valley in the Mapleton and Provo areas using the “minivibe” shaker truck built to generate P waves. Rather than collecting a shear-wave-velocity profile at a point as the “Liquidator” does, the USGS surveys will provide cross-sectional images several miles long extending west from the mountain front on the east side of Utah Valley. From these images, we will be able to model the dip of the Wasatch fault and the depths to bedrock and other layers in the subsurface. Bill Stephenson and Rob Williams of the USGS Denver office headed the effort. The USGS worked with faculty from the University of Utah and Brigham Young University, Bill Keach and John McBride. UDOT provided rights-of-way to perform work along state highways.

The “Liquidator” surveys were run in late July-early August over a period of about 1½ weeks. Local seismologists, engineers, and geologists visited a site on August 3 to view the operation and experience the ground shaking. The USGS was in Utah for about a week in late August. The data from these surveys will be processed and provided to the researchers developing the CVM. Preliminary results will be presented at Utah’s Earthquake Working Group meetings in February or March 2007. This new work will allow for a much more accurate characterization of relatively deep geologic conditions, and should produce some exciting results.



Local scientists and engineers view “Liquidator” in action near the I-80/5600 W. intersection in Salt Lake City on August 3, 2006.



USGS minivibe working along Utah State Highway 147 between Spanish Fork and Mapleton.